Instruction manual

Unitor Welding Inverter
UWI 150 TP
MMA (Stick) / TIG / TIG pulse / Welder

Revision date 11.02.2014

CONTENTS

1. GENERAL DESCRIPTION
2. TECHNICAL DATA
3. INSTALLATION
4. FRONT AND BACK PANEL
5. WELDING
6. ROUTINE MAINTENANCE
7. TROUBLESHOOTING
8. WIRING DIAGRAM
9. COMPONENTS AND SPARES
10. ACCESSORIES
11. SAFETY INSTRUCTIONS

DO NOT INSTALL, OPERATE OR REPAIR THIS EQUIPMENT WITHOUT READING THIS MANUAL INCLUDING THE SAFETY INSTRUCTIONS

1 GENERAL DESCRIPTION

UWI-150 TP is a compact and portable single phase inverter power source for professional MMA, TIG and TIG-pulse welding.

It connects to a standard 230V one phase socket, preferably with 16A slow fuses to allow full power.

The TP (total protection) function protects against too high input voltage and will close down the machine completely to prevent damage if input voltage exceeds 285V. A led on the rear panel will be lit to indicate that the protection is on. When the input voltage is reduced welding power will automatically be restored.

Safe in use. The automatic Voltage Reducing Function provides operator safety by reducing “touchable” voltage for the operator to max. 9V between electrode holder and work-piece.

Line voltage compensation keeps output of the power source constant regardless of fluctuation in input power from 15% below to 15% above rated input voltage.

Automatic Hot Start for stick arc starts makes arc striking easy and prevents electrode sticking.

Automatic Arc Force for stick electrode welding provides optimal arc characteristics for MMA (stick) welding.

Lift-Start in TIG mode provides easy and soft TIG arc starting, and both normal and pulsed TIG current enables optimal current also for sheet metal.

Step-less adjustment of welding current through whole current range: 5–150A, and remote control that can be attached to the TIG torch provides excellent control through the welding process.

Casing of high grade aluminium and industrial plastic to eliminate corrosion damage also contributes to low-weight which together with compact outer dimensions provides good portability.

Wind tunnel design for the internal cooling air flow protects electrical components and PC boards from dirt, dust, debris, greatly improving reliability.

Thermal overload protection with indicator lights helps prevent machine damage if the duty cycle is exceeded or airflow is blocked.

Total Protection function with indicator light prevents machine damage if excess voltage peaks in the

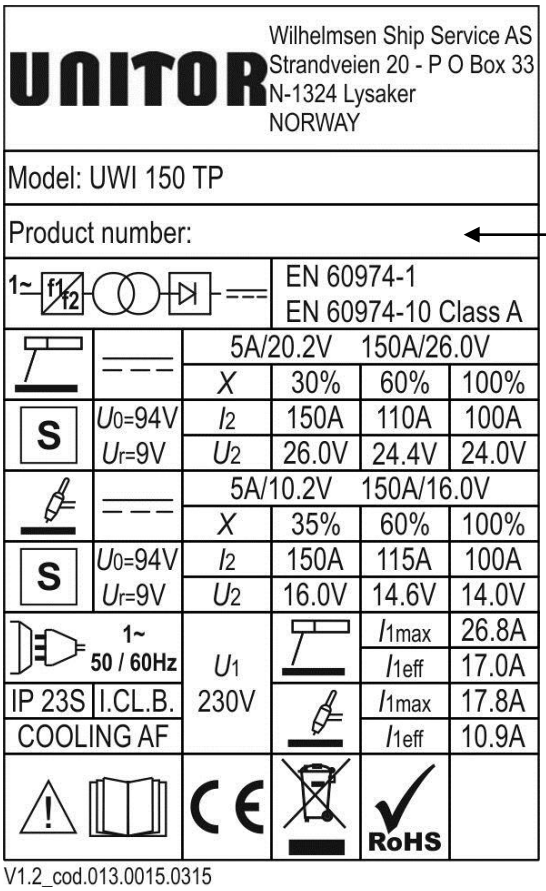
IDENTIFY COMPONENTS

Unitor Welding Inverter UWI 150 TP,
product number 191- 150150
is delivered with

5

1	Carrying strap and handle mounted on the machine	1 pce
2	2,5 m primary cable with plug, mounted on the machine.	1 pce
3	3 m welding cable with quick connector and electrode holder	1 pce
4	3 m return cable with quick connector and clamp	1 pce
5	Instruction Manual	1 pce
6	Carrying case	1pce

2 TECHNICAL DATA



The unique serial number for the machine will be printed here. Always give serial number when ordering spares or in other communication with WSS concerning your machine.

Type of welding machine

One-phase static transformer rectifier

Processes

MMA (Stick electrode / SMAW)

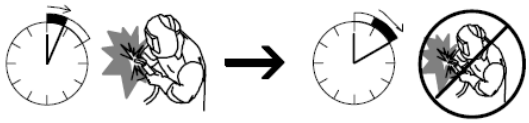
TIG (GTAW)

Pulsed TIG, pulse frequency 100Hz

Safety Marking

Suitable for use in areas with increased electric shock hazard

X: Duty cycle



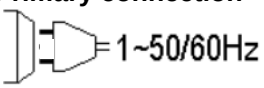
Duty Cycle is percentage of 10 minutes that unit can weld at rated load without overheating.
It refers to a 40°C environmental temperature. If unit overheats a thermal switch stops the output, the warning light for over-temperature is lit and the cooling fan continues to run. Wait fifteen minutes for unit to cool. Reduce amperage or duty cycle before starting to weld.

I_2 = Welding current.
Range 5 – 150A

U_r = Reduced open circuit voltage
Is the voltage (excluded any stabilization voltage or arc ignition) found between the output outlets when the welding machine is not welding. This is the voltage a welder can be exposed to between electrode holder and work piece.

U_2 = Arc voltage
Voltage present between the output outlets when welding is being carried out, in relation to a particular set current. The relation, for the various welding modes is the following:
MMA→ U2=(20+0,04*I2)
TIG → U2=(10+0,04*I2)

Primary connection



U_1 = Effective input voltage 230V
I_{1max} = Maximum value of input current at the corresponding duty cycle.
I_{1eff} = Effective value of input current at the corresponding duty cycle.

Cooling
COOLING AF= Forced air cooling (with a fan).

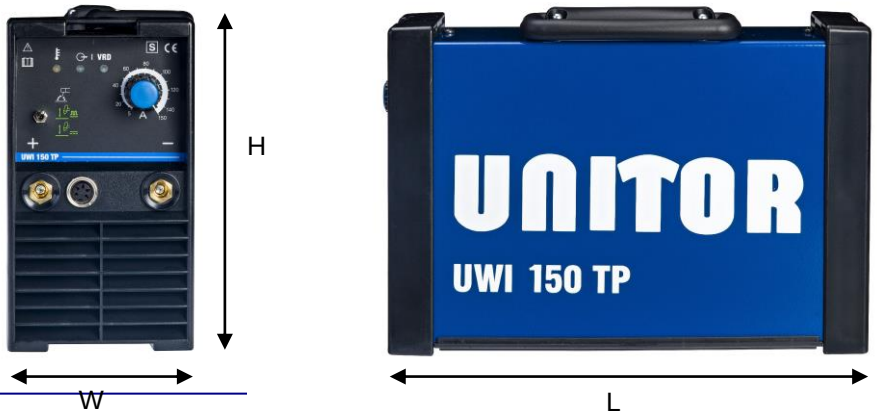
Protection class
IP23S= Ingress Protection class. Protection degree of the casing according to EN 60529
2: Protection against object not greater than 80mm in length and 12mm in diameter
3: Protection from sprayed water at an angle of 60º from vertical
S: Valid at standstill. (Should not be used for welding outdoors in heavy wind and rain)

Thermal insulation class
I.CL.H= Thermal class of the insulating materials and insulation systems.
resistant up to 180°C.

Standards
EN 60974-10 European Norm for electromagnetic compatibility.
EN 60974-1 European Norm for arc welding appliance: Current sources for welding.
CE Mark stating conformity to all safety standards and other standards required for sale within the European Union

Dimensions and weight

Height : 215mm
Length : 310mm
Width : 120mm
Weight : 4,4kg



3 INSTALLATION

Only qualified personnel should perform this installation.
Only personnel that have read and understood this Manual should install and operate this equipment.
Machine must only be plugged into a receptacle which is grounded in accordance with valid regulations.
Note
The power switch should be in the OFF position when installing work cable and electrode cable and when connecting power cord to input power.

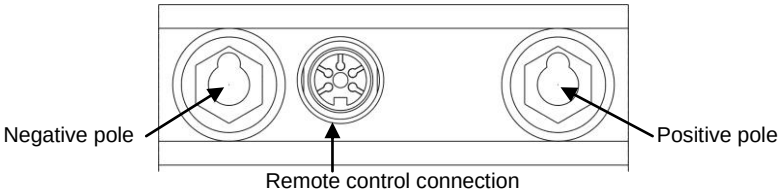
Select a suitable location
The UWI 150 TP inverter welder has an IP23S rating. Locate the welder in a dry location where there is free circulation of clean air into the louvers in the back and out the front of the unit.

Ensure minimum 50cm free space on all sides. If free flow of air is hindered the machine will overheat.

A location that minimizes the amount of smoke and dirt drawn into the louvers reduces the chance of dirt accumulation that can block air passages and cause overheating.

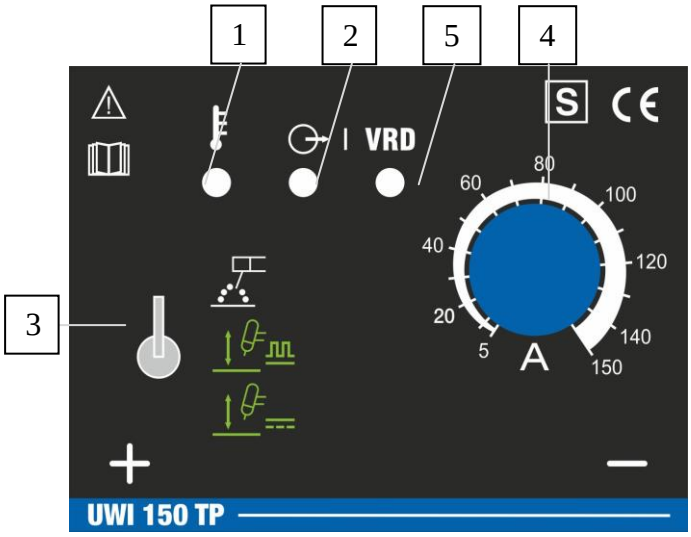
Avoid tilting
The machine must be placed on a secure, level surface, maximum 15º out of horizontal.

Assembly



Select polarity to electrode based on recommendations on the electrode package and the job at hand. For TIG welding negative (-) polarity should always be to the torch, and remote control attached to the torch and connected to the machine. (centre contact above)

4 FRONT AND BACK PANEL



Description

1. Power on warning. Green light when the machine is connected and switched on.

2. Thermal protection activated. Yellow light indicates that the protection thermostat has cut the output. Do not switch the machine off. The fan will be running and the thermostat resets automatically when the machine has cooled down sufficiently. The light will darken when the machine is live again.

3. Selection of welding process:
   Up: SMAW (MMA) welding with stick electrodes
   Middle: TIG (GTAW) pulse welding
   Down: TIG (GTAW) welding.

4. Welding current adjustment potmeter. Rotate knob clockwise to increase amperage, minimum to 150 Ampere

5. Active VRD signal. When lit this shows that the Voltage Reducing Device is active, reducing the voltage across the welding sockets. This will happen within 2 seconds after the welding arc is broken to protect the welder from electric chock.
   Full arc striking voltage will automatically be re-established when the welding circuit is re-established by touching the electrode to the work-piece

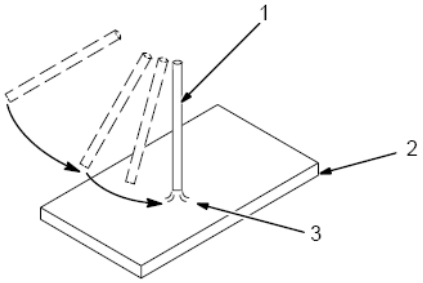
6. On/Off switch (Back panel)

7. Primary cable, 3 core 2,5mm², 2,5m long
   .

8. When lit this warning light indicates that the Total Protection function has been activated and input power has been cut because it has exceeded 285V ac.

5 WELDING

MMA (SMAW stick electrode) welding
Select MMA welding (selector switch up).
Connect ground (return) cable with good contact to the work piece.
Select polarity and amperage as recommended for the electrode and start arc as follows:
Drag electrode across work piece like striking a Match and lift electrode slightly after touching work.
If arc goes out electrode was lifted to high.
If electrode sticks to work piece, use a quick twist to free it.



1 Electrode
2 Workpiece
3 Arc

Hot start
The machine has automatic Hot Start 50% for stick electrode welding. This makes arc striking easier and reduces the possibility of electrode sticking

Arc Force
Automatic Arc Force 50% for stick electrode welding provides optimal arc characteristics even for cellulosic and aluminium electrodes.

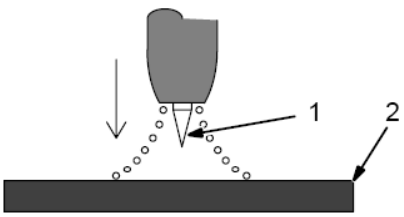
TIG / TIG pulse welding
Select TIG process (selector switch down) or TIG pulse process (selector switch in middle position)

TIG pulse is a definite advantage for welding sheet metal and thin walled plates and pipes. It provides better control for the welder and less heat input in the work piece due to the cooling obtained in the down-pulse period. This is especially important for poor heat conductors, like stainless steel.

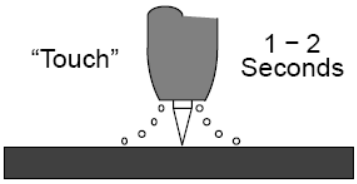
Connect TIG torch to negative (-) terminal on the machine. Connect ground (return) cable with good contact to the work piece. Attach remote control to the torch and connect it to the machine
When the TIG process is selected normal open-circuit voltage is not present before tungsten electrode touches and lifts from work piece. Only a low sensing voltage is present between electrode and work piece.
The solid-state output contactor does not energize until after electrode is touching work piece. This allows the electrode to touch the work piece without overheating, sticking, getting contaminated or contaminate the work piece.

Start the arc as follows:

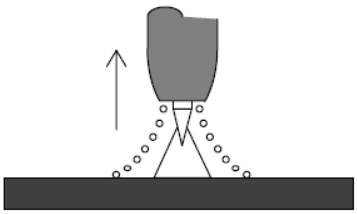
- Turn gas on.
- Touch tungsten electrode to workpiece at weld start point.
- Hold electrode to workpiece for 1-2 seconds, and slowly lift electrode. The arc is formed when the electrode is lifted.



1 Electrode
2 Workpiece

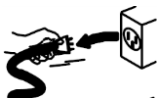
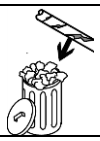
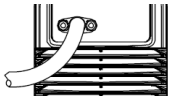
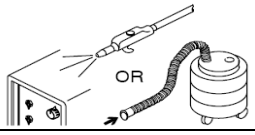
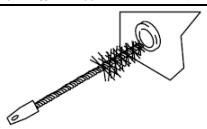
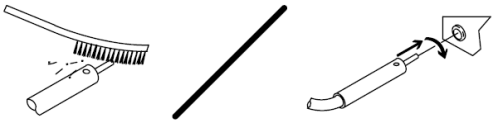
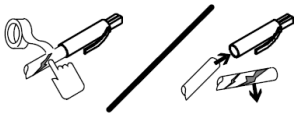
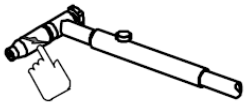
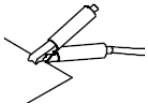
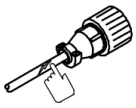


Touch the electrode to the work piece. Only sensing voltage will be present



Lift carefully and the arc will be established

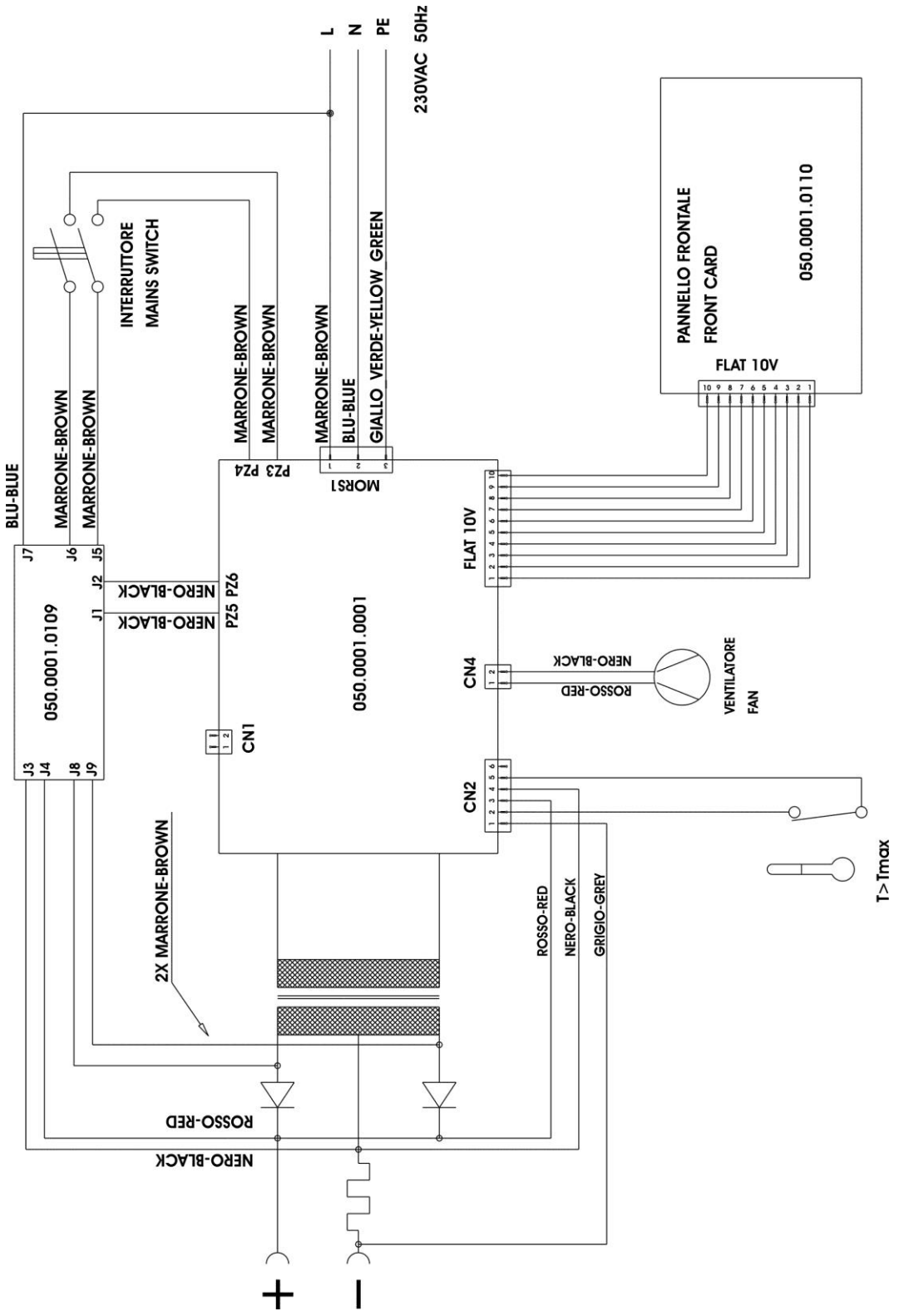
6 ROUTINE MAINTENANCE

Checkpoint	Action	Interval
Primary plug and socket 	Check connections and stretch relief	3 months or more often if needed
Primary cable 	Check for damage and replace if necessary	3 months or more often if needed
Primary cable stretch relief and connection 	Check for damage and tightness	3 months or more often if needed
Labels	Replace damaged or unreadable labels	3 months or more often if needed
Internal dust and dirt 	Blow out or vacuum inside	6 months or more often if needed
Welding current sockets 	Check and clean	3 months or more often if needed
Cable connectors 	Check, clean if needed and tighten	Prior to use / every 3 months
Welding cables 	Repair or replace if damaged	Prior to use / every 3 months
Electrode holders and torches 	Check, clean and replace if damaged	Prior to use / every 3 months
Ground clamps 	Check tightness and clean contact points	Prior to use / every 3 months
Remote controls, if relevant. 	Check function and condition of cables	3 months or more often if needed

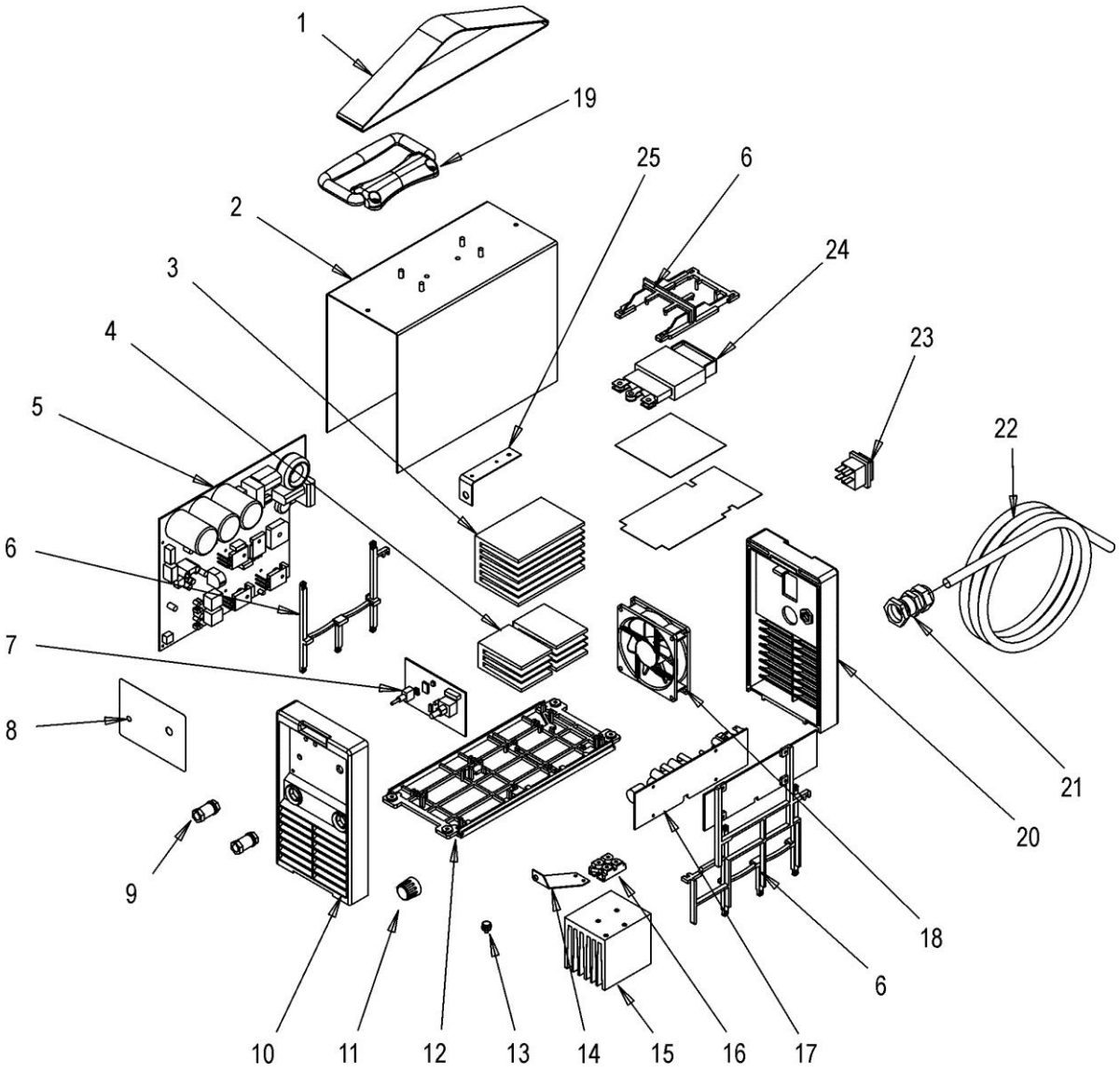
7 TROUBLESHOOTING

SYMPTOM	POSSIBLE REASON	SOLUTION
No output, no warning light, fan not running	Primary power does not reach the machine	Mains fuses blown
		Machine is not plugged in
		Broken primary cable
		Cable connection to machine is loose
		Machine not switched on
		On/off switch damaged
No output, yellow warning light	Voltage protection activated	Too high input voltage, should be below 285V AC
	Thermal protection activated	Used at too high duty cycle, wait until machine has cooled down and power returns. Weld with more breaks or lower current
		Cooling air flow is hindered, remove obstructions
		Heat development in loose electrode holder or ground cable connections
		Broken fan, repair or replace
		Too much dirt in power source compartment, clean out.
No arc, no warning light	Incomplete circuit	Check ground cable connections and torch connection
Unstable arc	Polarity	Check that polarity set on the machine matches the wire
	Poor contact	Check ground clamp and torch connections
	Contaminated work piece	Clean

8 WIRING DIAGRAM



9 COMPONENTS AND SPARES



Component List

N°	CODE	DESCRIPTION
1	005.0001.0001	BELT
2	011.0001.0014	UPPER COVER
3	015.0001.0001	HEAT SINK L=107mm
4	015.0001.0002	HEAT SINK L=50mm
5	050.0001.0001	POWER BOARD
6	012.0001.0000	INTERNAL FRAMEWORKS
7	050.0002.0110	LOGIC FRONT PANEL
8	013.0015.0823	FRONT LABEL
9	021.0001.1022	FIXED SOCKET 200A
10	012.0001.0150	FRONT PLASTIC PANEL
11	014.0002.0001	KNOB
12	012.0001.0007	LOWER COVER
13	040.0003.1080	TERMAL SWITCH
14	045.0006.0002	COPPER BRACKET
15	015.0001.0003	HEAT SINK L=75mm
16	032.0002.2003	DIODE
17	050.0001.0109	DOUBLER - OVERCUT BOARD
18	003.0002.0001	FAN
19	011.0006.0031	HANDLE
20	010.0006.0004	REAR PLASTIC PANEL
21	045.0000.0007	CABLE CLAMP
22	045.0002.0001	SUPPLY CABLE
23	040.0001.0001	TWO-POLE SWITCH
24	010.0007.0005	PLANAR TRANSFORMER
25	045.0005.0003	SHUNT

For ordering spares please state:

Model: **UWI 150 TP**
Serial no: **…….**
Pos no: **…….**
Code: **…….**

10 ACCESSORIES

Stick Welding Accessories for UWI 150 TP	
AutoVision Plus Welding Face Shield with Adjustable Shade 9 To 13	196 767001
Autovision Plus outside cover lens 10 pcs and two frames	196 766997
Long lined welding gloves, 6 pairs	196 632786
Electrode holder with 3m cable and connector (included with machine)	196 627005
Ground clamp with 3m cable and connector (included with machine)	196 633172
Wire brush, steel, 2 rows, 6 pcs	196 632976
Wire brush, stainless steel, 2 rows, 6 pcs	196 632984
Chipping hammer steel, 2 pcs	196 633008
Chipping hammer stainless steel	196 632992
Welding gauge type J	196 516161
TIG welding Accessories for UWI 150 TP	
Specially thin and soft TIG gloves, 6 pairs	197 632794
TIG-torch T-150 with gas valve and DIX 25 connector	197 150000
Accessories kit for TIG-torch	197 607810
Remote control for UWI-150 TP	191 150151
Argon regulator with flow adjustment 0-32 l/min	197 619247
Flowcontrol meter for use at torch nozzle	197 597328
Flowcontrol needle valve for gas flow adjustment	197 597310
Trolley for machine, equipment and E-10 gas cylinder	196 778149
Argon for TIG shielding is available in 10 l cylinders (E-10)* and 50 l cylinders (E-50)	

*) An E-10 cylinder will normally have sufficient gas for 3-5 gas flow hours depending on flow setting

Remote control for UWI 150 TP

Trolly with 10l Argon for TIG and tool box, here with a 200A machine

11 SAFETY INSTRUCTIONS

Arc Welding Hazards

The safety information given below is only a summary of the more complete safety information found in the Safety Standards listed in Section 1-5. Read and follow all Safety Standards.
Only qualified persons should install, operate, maintain, and repair this unit. During operation, keep everybody, especially children, away.

ELECTRIC SHOCK can kill.
Touching live electrical parts can cause fatal shocks or severe burns. The electrode and work circuit is electrically live whenever the output is on. The input power circuit and machine internal circuits are also live when power is on. In semiautomatic or automatic wire welding, the wire, wire reel, drive roll housing, and all metal parts touching the welding wire are electrically live. Incorrectly installed or improperly grounded equipment is a hazard.

Do not touch live electrical parts. Wear dry, hole-free insulating gloves and body protection. Insulate yourself from work and ground using dry insulating mats or covers big enough to prevent any physical contact with the work or ground. Do not use AC output in damp areas, if movement is confined, or if there is a danger of falling. Use AC output ONLY if required for the welding process. If AC output is required, use remote output control if present on unit.

Disconnect input power before installing or servicing this equipment. Always verify the supply ground − check and be sure that input power cord ground wire is properly connected to ground terminal in the cord plug and that the plug is connected to a properly grounded receptacle outlet. When making input connections, attach proper grounding conductor first − double-check connections. Frequently inspect input power cord for damage or bare wiring −replace cord immediately if damaged − bare wiring can kill. Turn off all equipment when not in use.

Do not use worn, damaged, undersized, or poorly spliced cables. Do not drape cables over your body. If earth grounding of the work-piece is required, ground it directly with a separate cable. Do not touch electrode if you are in contact with the work, ground, or another electrode from a different machine.

Use only well-maintained equipment. Repair or replace damaged parts at once. Maintain unit according to manual. Wear a safety harness if working above floor level. Keep all panels and covers securely in place. Clamp work cable with good metal-to-metal contact to work-piece or worktable as near the weld as practical. Insulate work clamp when not connected to work-piece to prevent contact with any metal object. Do not connect more than one electrode or work cable to any single weld output terminal.

SIGNIFICANT DC VOLTAGE exists after removal of input power on inverters. Turn off inverter, disconnect input power, and discharge input capacitors before touching any parts.

FUMES AND GASES can be hazardous.
Welding produces fumes and gases. Breathing these fumes and gases can be hazardous to your health. Keep your head out of the fumes. Do not breathe the fumes. If inside, ventilate the area and/or use exhaust at the arc to remove welding fumes and gases. If ventilation is poor, use an approved air-supplied respirator. Read the Material Safety Data Sheets (MSDSs) and the manufacturer's instructions for metals, consumables, coatings, cleaners, and degreasers.
Work in a confined space only if it is well ventilated, or while wearing an air-supplied respirator. Always have a trained watchperson nearby. Welding fumes and gases can displace air and lower the oxygen level causing injury or death. Be sure the breathing air is safe.
Do not weld in locations near degreasing, cleaning, or spraying operations.The heat and rays of the arc can react with vapors to form highly toxic and irritating gases.
Do not weld on coated metals, such as galvanized, lead, or cadmium plated steel, unless the coating is removed from the weld area, the area is well ventilated, and if necessary, while wearing an air-supplied respirator. The coatings and any metals containing these elements can give off toxic fumes if welded.

ARC RAYS can burn eyes and skin.
Arc rays from the welding process produce intense visible and invisible (ultraviolet and infrared) rays that can burn eyes and skin. Sparks fly off from the weld. Wear a welding helmet fitted with a proper shade of filter to protect your face and eyes when welding or watching. Wear approved safety glasses with side shields under your helmet. Use protective screens or barriers to protect others from flash and glare; warn others not to watch the arc. Wear protective clothing made from durable, flame-resistant material (leather and wool) and foot protection.

WELDING can cause fire or explosion.
Welding on closed containers, such as tanks, drums, or pipes, can cause them to blow up. Sparks can fly off from the welding arc. The flying sparks, hot workpiece, and hot equipment can cause fires and burns. Accidental contact of electrode to metal objects can cause sparks, explosion, overheating, or fire. Check and be sure the area is safe before doing any welding. Protect yourself and others from flying sparks and hot metal. Do not weld where flying sparks can strike flammable material. Remove all flammables within 35 ft (10.7 m) of the welding arc. If this is not possible, tightly cover them with approved covers. Be alert that welding sparks and hot materials from welding can easily go through small cracks and openings to adjacent areas. Watch for fire, and keep a fire extinguisher nearby. Be aware that welding on a ceiling, floor, bulkhead, or partition can cause fire on the hidden side. Do not weld on closed containers such as tanks, drums, or pipes, unless they are properly prepared Connect work cable to the work as close to the welding area as practical to prevent welding current from travelling long, possibly unknown paths and causing electric shock and fire hazards. Do not use welder to thaw frozen pipes. Remove stick electrode from holder or cut off welding wire at contact tip when not in use. Wear oil-free protective garments such as leather gloves, heavy shirt, cuff-less trousers, high shoes, and a cap. Remove any combustibles, such as a butane lighter or matches, from your person before doing any welding.

FLYING METAL can injure eyes.
Welding, chipping, wire brushing, and grinding cause sparks and flying metal. As welds cool, they can throw off slag. Wear approved safety glasses with side shields even under your welding helmet.

BUILDUP OF GAS can injure or kill.
Shut off shielding gas supply when not in use. Always ventilate confined spaces or use approved air-supplied respirator.

HOT PARTS can cause severe burns.
Do not touch hot parts bare handed. Allow cooling period before working on gun or torch.

MAGNETIC FIELDS can affect pacemakers.
Pacemaker wearers keep away. Wearers should consult their doctor before going near arc welding, gouging, or spot welding operations.

NOISE can damage hearing.
Noise from some processes or equipment can damage hearing. Wear approved ear protection if noise level is high.

CYLINDERS can explode if damaged.
Shielding gas cylinders contain gas under high pressure. If damaged, a cylinder can explode. Since gas cylinders are normally part of the welding process, be sure to treat them carefully. Protect compressed gas cylinders from excessive heat, mechanical shocks, slag, open flames, sparks, and arcs. Install cylinders in an upright position by securing to a stationary support or cylinder rack to prevent falling or tipping. Keep cylinders away from any welding or other electrical circuits. Never drape a welding torch over a gas cylinder. Never allow a welding electrode to touch any cylinder. Never weld on a pressurized cylinder − explosion will result. Use only correct shielding gas cylinders, regulators, hoses, and fittings designed for the specific application; maintain them and associated parts in good condition. Turn face away from valve outlet when opening cylinder valve. Keep protective cap in place over valve except when cylinder is in use or connected for use. Read and follow instructions on compressed gas cylinders, associated equipment, and CGA publication P-1 listed in Safety Standards.

Additional precautions for installation, operation, and maintenance

Do not install or place unit on, over, or near combustible surfaces. Do not install unit near flammables. Do not overload building wiring − be sure power supply system is properly sized, rated, and protected to handle this unit.

FALLING UNIT can cause injury.
Use lifting eye to lift unit only, NOT running gear, gas cylinders, or any other accessories. Use equipment of adequate capacity to lift and support unit. If using lift forks to move unit, be sure forks are long enough to extend beyond opposite side of unit.

OVERUSE can cause OVERHEATING
Allow cooling period; follow rated duty cycle. Reduce current or reduce duty cycle before starting to weld again. Do not block or filter airflow to unit.

STATIC (ESD) can damage PC boards.
Put on grounded wrist strap BEFORE handling boards or parts. Use proper static-proof bags and boxes to store, move, or ship PC boards.

MOVING PARTS can cause injury.
Keep away from moving parts. Keep away from pinch points such as drive rolls.

WELDING WIRE can cause injury.
Do not press gun trigger until instructed to do so. Do not point gun toward any part of the body, other people, or any metal when threading welding wire.

MOVING PARTS can cause injury.
Keep away from moving parts such as fans. Keep all doors, panels, covers, and guards closed and securely in place.

H.F. RADIATION can cause interference.
High-frequency (H.F.) can interfere with radio navigation, safety services, computers, and communications equipment. Have only qualified persons familiar with electronic equipment perform this installation.
The user is responsible for having a qualified electrician promptly correct any interference problem resulting from the installation.
If notified about interference, stop using the equipment at once. Have the installation regularly checked and maintained. Keep high-frequency source doors and panels tightly shut, keep spark gaps at correct setting, and use grounding and shielding to minimize the possibility of interference.

ARC WELDING can cause interference.
Electromagnetic energy can interfere with sensitive electronic equipment such as computers and computer-driven equipment such as robots.
Be sure all equipment in the welding area is electromagnetically compatible.
To reduce possible interference, keep weld cables as short as possible, close together, and down low, such as on the floor.
Locate welding operation 100 meters from any sensitive electronic equipment.
Be sure this welding machine is installed and grounded according to this manual.
If interference still occurs, the user must take extra measures such as moving the welding machine, using shielded cables, using line filters, or shielding the work area.

EMF Information

Considerations about welding and the effects of low frequency electric and magnetic fields.
Welding current, as it flows through welding cables, will cause electromagnetic fields.
There has been and still is some concern about such fields.
However, after examining more than 500 studies spanning 17 years of research, a special blue ribbon committee of the National Research Council concluded that: “The body of evidence, in the committee’s judgment, has not demonstrated that exposure to power-frequency electric and magnetic fields is a human-health hazard.”
However, studies are still going forth and evidence continues to be examined. Until the final conclusions of the research are reached, you may wish to minimize your exposure to electromagnetic fields when welding or cutting.

To reduce magnetic fields in the workplace, use the following procedures:
1. Keep cables close together by twisting or taping them.
2. Arrange cables to one side and away from the operator.
3. Do not coil or drape cables around your body.
4. Keep welding power source and cables as far away from operator as practical.
5. Connect work clamp to workpiece as close to the weld as possible.

About Pacemakers:
Pacemaker wearers consult your doctor first. If cleared by your doctor, then following the above procedures is recommended.

DECLARATION OF CONFORMITY

CE

We hereby state that the machine type

UNITOR WELDING INVERTER UWI-150 TP

is in compliance with the directives

2004/108/CEE
2006/95/CE
2011/65/EU

and that the following standards apply

EN 60974-1
EN 60974-10

Last two digits of the year CE marking

13

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P. IVA 02783960244 - C.F. 02710490281
Reg. Impr. VI n° 52214 - R.E.A. N° 274736
Capitale sociale i.v. € 52.000,00

Belvedere, 01/01/2013

Amm. Giorgio TONIOLO

Instruction manual

& spare part list

Fraser/surrey Gaspe Gros Caouna Halifax Hamilton Harbour Grace H
Westminster Bc Pictou/halifax Pointe Aux Pic.quebec Port Alfred Port C
Port Of Quebec Port Weller Powell River Prince Rupert Roberts Bank Sa
halifax Squamish St. Catherines St.john's, Nfld St.romuald Stephens
alleyfield Vancouver Victoria Weymouth Windsor Yarmouth Ancud / Lake
Coronel Corral Huasco Las Ventanas Lirquen Lota Penco Puerto Montt Puerto Williams Punta Arenas Quintero San Antonio San Vicente Talcahuano Tocopilla Valparaiso Antilla Bahia Honda Banes Baracoa Cabanas Caibarien Cardenas Casilda Ceiba Hueca Cienfuegos Guantanamo Guayabal Havana Isabel De Sagua Manati Mariel Media Luna Moa Nicaro Niquero Nuevitas Pilon Puerto Padre Santiago De Cuba Sigloo **Genoa** Finn Tanamo Tunas De Zaza Vita Balao Esmeraldas Guayaquil La Libertad Manta Puerto Bolivar Freeport/bahamas Guam Mahdia Acapulco Campeche Ciudad Del Carmen Coatzacoaloos Cozumel Dos Bocas Ensenada Guaymas La Paz Lazaro Cardenas Mazatlan Progreso Puerto Vallarta Salina Cruz Tampico Topolobampo Tuxpan Vera Cruz Bonaire Bullen Bay Curacao Aguadulce Almirante Armuelles Bahia Las Minas Balboa Cristobal Manzanillo Int.term. Vacamonte Callao Chimbote Ilo Matarani Paita Pisco Guayama Guayanilla Mayaguez Ponce San Juan Yabucoa St. Vincent Chaguaramas La Brea Point Fortin Point Lisas Pointe-a-pierre Port Of Spain Tembladora Aberdeen,wa Alameda Albany,n.y. Alexandria, Va Algiers Point Amelia Anacortes, Wa Anchorage,ak Annapolis,md Antioch Aransas Pass Tx Astoria, Or Baltimore Baton Rouge Bayonne Baytown Beaumont Bellingham, Ma Bellingham, Wa Benicia, Ca Boston, Ma Bridgeport Bridgeport, Conn Brooklyn, Ny Brownsville Tx Brunswick Brunswick, Ga ucksport,me Buras Camden Camden, Nj Cameron La Chalmette Charleston, Sc Cheasapeake Chester Chicago Claymont Convent Coos Bay, Or Corpus Chr.tx Crockett Darrow Davant Deer Park Delaware City Destrehan Donaldsonville Dutch Harbor, Ak Eastport, Me Eureka Everett, Wa Fairless Hills Famagusta Ferndale,wa Freeport Tx Galveston Tx Garyville Geismar Georgetown, Sc Gloucester, Nj Good Hope Gramercy Grand Isle Grays Harbour Gretna Gulfport, Ms Harvey Honolulu, Hawaii Hoquiam, Wa Houma Jacksonville Kalama Kalama, Wa Kenai Key W
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Myrtle Grove Naples Nederland T
w York Newington, Nh Newport News, Va Newport, Or Newport, Ri Nikiski Norco Norfolk Oakland Olympia, Wa Orange, **Rotterdam** Tx Palm Beach Panama City, Fl Pasadena Pascagoula, Ms Paulsboro, Nj Pennsauken, Nj Pensacola, Fl Petaluma Philadelphia Piney Point, Md Pittsburg Plaquemine Point Comfort Tx Port Allen Port Angeles, Wa Port Arthur Tx Port Canaveral Port Everglades Port Hueneme Port Isabel Tx Port Manatee, Fl Port Neches Tx Port Royal, Sc Port St. Joe, Fl Port Townsend, Wa Portland, Me Portland, Or Portsmouth Portsmouth, Nh Providence, Ri Queens, Ny Redwood City Reserve Revere, Ma Richmond Richmond, Va Sacramento Salem Salem, Ma San Diego San Francisco Sandwich, Ma Savannah Searsport, Me Seattle Seward Sparrows Point St.petersburg, Fl St.rose Staten Island, Ny Stockton Tacoma, Wa Tampa Texas City The Bronx, Ny The Loop Valdez Vancouver, Wa Venice West Palm Beach Westville, Nj Wilmington, Ca Wilmington, De **Houston** Wilmington,nc Yonkers, Ny Yorktown, Va Fray Bentos Jose Ignacio Montevideo Nueva Palmira Amuay Bay Bajo Grande Cumarebo El Palito El Tablazo Guanta Guaranao Jose Bay La Guaira La Salina Maracaibo Pertigalete Puerto Cabello Puerto La Cruz Puerto Miranda Puerto Ordaz Punta Cardon Punta De Palmas Punto Fijo San Lorenzo, Vz St.croix Aeroskobing Assens Bagenkop Bogense Copenhagen Ebeltoft Enstedvaerket Havn Esbjerg Fakse Ladeplads Havn Fredericia Frederiksund Frederiksvaerk Fredrikshavn Faaborg Gedser Great Belt Grenaa Graasten Gulfhavn Haderslev Halsskov Hanstholm Helsingor Hirtshals Hobro Holbaek Horsens Kalundborg Kertminde Koge Kolding Korsor Lemvig Mariager Marstal **Oslo** Middlefart Naestved Nakskov Nyborg Nykobing Falster Nykobing Mors Nykobing Skjaelland Odense Orehoved Falster Randers Ronne Rudkobing Sakskobing Skaelskor Skaerbaek Skagen Skive Sonderborg Stege Stigsnaesvaerkets Havn Svendborg Studstrupvaerkets Havn Thisted Thorshavn Vejle Vordingborg Aabenraa Aalborg Aarhus Kunda Loksa Muuga Paldiski Paljassaare Parnu Tallinn Dalsbruk Hamina/fr.havn Hanko/hangoe Helsinki Ingaa/inkoo Jakobstad Kalajoki Kantvik Kaskinen/kasko Kemi Kemio Kokkola/karleby Kotka Koverhar Kristinestad Lappvik Lovisa Mariehamn Merikarvia Nystad Naantali Oulu Pargas Pori Porvoo/borgaa Rauma Raahe/brahestad Skoeldvik Tammisaari Teijo Tolkis Torneaa Turku Valkom/valko Vaasa Akureyri Isafjørdur Reykjavik Arklow Aughinish Bantry Cork Drogheda Dublin Dun Laoghaire Dundalk Foynes Galway Limerick Moneypoint Ringaskiddy Tarbert Waterford Liepaja Mersrags Riga Roja Salacgriva Skulte Ventspils Butinge Klaipeda Agnefest Alta **Piraeus** Arendal Asker Askoy Aukra Aure Averoey Bergen Berlevaag Bodoe Boemlo Brattvag Breivika Brevik Baatsfjord Dirdal Drammen Dusavik Egersund Eide Elnesvaagen Eydehavn Fagerstrand Farsund Finnsnes Flekkefjord Floroe Flaam Fosnavaag Fraena Fredrikstad Frei Gamvik **Genoa** Geiranger Gjemnes Glomfjord Gravdal Grimstad Gudvangen Halden Halsa Hammerfest Harstad Haugesund Hellesylt Heroeya Hjelmeland Hoeyanger Holla Holmestrand Hommelvik Honningsvaag Horten Husnes Jelsa Jessheim Joerpeland Joessinghamn Kambo Karmoey Kirkenes **Singapore** Krageroe Kristiansand Kristiansund Kvinesdal Kyrksaeterora Kaarsto Larvik Leknes Lillesand Lyngdal Mandal Mehavn Mo I Rana Molde Mongstad Mosjoen Moss Muruvik Maaloey Namsos Narvik Nesset Odda Oelen Oersta Orkanger Porsgrunn Rafnes Randaberg Raubergvika Risoer Sandefjord Sandnes Sandnessjoen Sarpsborg Sauda Skien Skjervoey Slagen Slagentangen Smoela Soevik Sola Sorreisa Sortland Stavanger Stord Sture Sunndalsoera **Dubai** Surnadal Svelgen Svolvaer Tananger Tau Thamshamn Tingvoll Tjeldbergodden Toensberg Tofte Tomrefjord Tromsoe Trondheim Tustna Tvedestrand Tyssedal Tysvaer Ulsteinvik Vadsoe Vardoe Verdal Vik Volda Aagotnes Aaheim Aalesund Aalvik Aardal i Ryfylke Aardalstangen Gdansk Gdynia Kolobrzeg Police Swinoujscie Szczecin Arkangelsk Baltiysk De Kastri Kaliningrad Kandalaksha Kavkaz Kronshtadt Lomonosov Murmansk Nakhodka Novorossiysk Primorsk Sakhalin Sakhalin Severomorsk St. Petersburg Svetlyi Taman Temruk Temryuk Tuapse Vladivostok Vostochniy, Port Vostochnyi Vyborg Bohus Brofjorden Falkenberg Gavle Gothenburg Hallstavik Halmstad Helsingborg Hoganas Holmsund Hudiksvall Iggesund Kalmar Karlshamn Karlskrona Karlstad Koeping Landskrona Lidkoping Lilla Edet Luleaa Lysekil Malmoe Mariestad Marstrand Munkedal Norrkoeping Norrsundet Norrtalje Nynashamn **Rotterdam** Ornskoldsvik Oskarshamn Oxelosund Pitea **Shanghai** Simrishamn Skarhamn Skelleftehamn Skutskar Slite Soderhamn Sodertalje Solvesborg Stenungsund Stockholm Stromstad Sundsvall Surte Trelleborg Uddevalla Umeaa Varberg Vastervik Vasteraas Visby Wallhamn Ystad Aberdeen Appledore Arbroath Ardersier Ardrossan Avonmouth Ayr Ballycastle Banff Barking Barnstaple Barrow In Furness Barry Barton On Humber Belfast Berwick Upon Tweed Billingham Birkenhead Blyth Boston Bowling Braefoot Bay Bridgend Bridlington Bridport Bristol Briton Ferry Brixham Bromborough Buckie Burntisland Burton Upon Stather

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